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DESCRIPTIONS OF NEW AND IMPERFECTLY KNOWN SPECIES AND GENERA OF GOBIOID AND PLEURONECTID FISHES IN THE UNITED STATES NATIONAL MUSEUM

BY

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DESCRIPTIONS OF NEW AND IMPERFECTLY KNOWN SPECIES AND GENERA OF GOBIOID AND PLEURONECTID FISHES IN THE UNITED STATES NATIONAL MUSEUM[1]

By Isaac Ginsburg
United States Bureau of Fisheries

In my studies of the fishes of the Gulf of Mexico, I found it necessary to prepare monographic accounts of the genera *Gobiosoma* and *Paralichthys*, in order to establish definitely the taxonomic status and the morphological as well as the geographical limits of the fishes of these genera occurring on the Gulf coast of the United States. As a result of these studies, new species have been discovered in the collection of the National Museum, and these are described in this paper. The courtesy of Dr. Alexander Wetmore and Dr. Leonhard Stejneger, of the National Museum, in placing the material and the facilities of the Museum at my disposal, is thankfully acknowledged. The three drawings for this paper were made by Miss Louella E. Cable, of the United States Bureau of Fisheries.

Family PLEURONECTIDAE

Subfamily Paralichthyinae

Genus PARALICHTHYS Girard

PARALICHTHYS SCHMITTI, new species

Description of type.—Sinistral. Scales ctenoid on eyed side, cycloid on blind side, in 68 rows over straight part of lateral line to end of hypoural, about 29 rows over the curved part. Accessory scales present on both sides, very numerous, nearly covering surface of many regular scales, and massed in bands around edges of nearly all scales. Scales cover entire head and body, except lower jaw and snout of both sides and preopercle and maxillary of blind side; preopercle of eyed side completely scaled; maxillary of eyed side incompletely scaled at distal end; small more or less embedded scales extending on rays of vertical fins except those near either end; ventral on eyed side

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with similarly small and embedded scales; ventral of blind side and pectoral of both sides without scales evident at the surface; caudal covered with small scales on both sides nearly to posterior margin. Gill rakers quite short, nine on lower limb of first gill arch, three on upper limb with a tubercle above, the same number on both sides. D. 80. A. 63. Pectoral rays 12 on both sides. Origin of dorsal a little in advance of anterior margin of eye; base curving downward anteriorly, to blind side; anterior rays considerably shorter than those over middle part of body; all rays simple, except last 10, the penultimate ray and the three next to it, in front, branching dichotomously twice, the others branching but once. Origin of anal somewhat in advance of base of pectoral; all rays simple except last 11. Ventrals symmetrically placed, equal in length, the tip reaching to base of second anal ray. Pectoral of eyed side a little longer than that of opposite side, not reaching lateral line on either side. Caudal biconcave. Maxillary extending backward somewhat past a vertical through posterior margin of lower eye at a distance less than the diameter of the pupil. Teeth in one row; anterior teeth of upper jaw quite large, caninoid, lateral ones quite small; teeth of lower jaw subequal, but slightly decreasing in size posteriorly, nearly as large as anterior teeth of upper jaw. Mouth oblique, outline of gape somewhat curving; a horizontal line through distal edge of upper lip falling somewhat below upper edge of lower eyeball; lower jaw equal in front with upper jaw, its anterior edge vertical; chin angular; articulation of mandible on a vertical behind posterior margin of eye. Anterior and posterior margins of lower eye placed somewhat behind those of upper. Anterior nostril with a comparatively short flap behind and with a raised edge in front; posterior nostril somewhat larger, its rim not raised. Preanal spine not evident on surface. Length of a chord subtending the curve in the lateral line 3.2 in straight part to end of hypoural, a vertical from a chord to apex of curve three times in chord.

Measurements.[2]—Total length, 455. Standard length, 381. Depth, 168 (44.1); head (to end of scaled part, not including the soft border), 114 (29.9); maxillary, 58 (15.2); interorbital, 12 (3.2); pectoral of eyed side, 47 (12.3); pectoral of blind side, 42.5 (11.2); caudal, 75 (19.7); ventral, 33.5 (8.8); depth of caudal peduncle, 36 (9.5); snout, (to upper eyeball), 33.5 (8.8); eyeball, 17.5 (4.6).

Color.—Eyed side quite dark, irregularly shaded. Some more or less diffuse spots present, two or three very faintly suggesting ocelli. Pectoral of eyed side with transverse rows of somewhat elongate spots. Two diffuse curved bands on caudal, against an irregularly shaded background. Lower side normally light colored, the vertical

[2] Measurements in this paper are recorded as follows: The first number is the actual measurement of the given part in millimeters; the number in parentheses is the percentage in the standard length.

fins, the ventral, and the distal third of caudal with well-defined dark blotches; a narrow area along upper and lower margins, anteriorly, speckled with small brown spots, the speckling continued, but less distinct, on eyed side.

Holotype.—U.S.N.M. No. 88831. Juan Fernandez Island, Chile. The specimen was collected by Dr. Waldo L. Schmitt, curator of marine invertebrates in the National Museum, during his investigations of the marine fauna of South America, and I take pleasure in naming the species after Doctor Schmitt.

Remarks.—This species is closely related to *Paralichthys fernandezianus* Steindachner,[3] but the latter species evidently has much smaller scales. In his original description of *fernandezianus*, Steindachner states "L.l.c. 140." This is a number greater by a wide margin than several other species of *Paralichthys* described by the same author and shows an unusually finely scaled species. In the type specimen of *schmitti* the grooved scales in the lateral line are covered by thick skin and numerous accessory scales, and are partly hidden by the overlapping normal scales on either side. An exact count of the modified scales in the lateral line is therefore impossible; but the number of such scales very closely coincides with the number of oblique rows over the lateral line, or approximately 97. This number approximates that of most species belonging to the typical subgenus *Paralichthys*, while that given for *fernandezianus* shows too wide a difference to be accounted for by individual variability. Another significant difference in the types of the two species is found in the number of gill rakers. That difference, however, may be due to individual variability, and its true value, if any, may be determined only by a frequency distribution study of numbers of individuals. Another species with which the present should be compared is *Paralichthys hilgendorfi* Steindachner.[4] It is to be noted that the present species has the fins very distinctly blotched on the blind side, an unusual color mark for a species of *Paralichthys*. The dorsal in *fernandezianus* is also blotched, but this unusual color pattern is not described for *hilgendorfi* and is evidently not present in the latter. As to structural differences, comparing the specimen studied with the description of *hilgendorfi*, we find that it has one more ray in the pectoral, which is also shorter, the maxillary is longer, the snout longer, the eye smaller, and the interorbital wider. The last two differences may be due to the difference in size of the specimens; but the other characters are of use in indicating specific divergences in *Paralichthys*, although the exact morphological limits remain to be worked out on series of specimens, as is necessary in all other

[3] Fauna Chilensis, vol. 3, p. 208, 1905 (Zool. Jahrb., Suppl.-Band 6).
[4] *Idem*, p. 209.

closely related species of this genus. Still another significant difference is that the type of *hilgendorfi* is dextral while that of *schmitti* is sinistral, but the true value of this difference is again indeterminable from single specimens. Most species of *Paralichthys* are constantly sinistral, but two species at least are also frequently dextral. Finally, in his account of *hilgendorfi*, Steindachner describes "Eine sehr stumpfe knöcherne Leiste auf der Stirne, schräge nach vorn zur Schnauze ziehend", a condition not evident in *schmitti*. From all other species of *Paralichthys*, except *fernandezianus* and *hilgendorfi*, having ctenoid scales on eyed side and cycloid on blind side, and occurring on the Pacific coast of North and South America, *schmitti* is distinguished by the small number of gill rakers.

PARALICHTHYS TROPICUS, new species

Description of type.—Sinistral. Vertebrae 10+26. Scales cycloid on both sides, in 67 oblique rows over straight part of lateral line to end of hypoural, 28 in a chord subtending the arch in the lateral line, 34 oblique rows over the arch. Accessory scales present on both sides, quite numerous, except in area along the middle posterior part of body; most other regular scales on body having a complete circle of small accessory scales around their edges. Scales covering entire head and body, except lower jaw and snout of both sides and preopercle and maxillary of blind side; preopercle of eyed side incompletely scaled, a few scales at end of maxillary of eyed side; smaller scales extending on rays of vertical fins, except those near either end, on ventral of eyed side and on caudal nearly to its end. Both pectorals and ventral of blind side scaleless. Gill rakers rather short, but little longer than pupil, 11 on lower limb (12 on eyed side) of first gill arch, 2 on upper limb at the angle with 2 tuberosities above. D. 75. A. 58. Pectoral rays 11 on both sides. Origin of dorsal nearly on a level with anterior margin of eye, base curving downward anteriorly to blind side, anterior rays distinctly shorter than those near posterior part of body; origin of anal somewhat in advance of base of pectoral; last 12 rays of vertical fins branched, others simple. Ventrals of both sides symmetrically placed, subequal in length and width of base, the tip reaching to base of third anal ray. Pectoral of eyed side reaching angle of curve in lateral line, the one on blind side falling considerably short of angle. Caudal distinctly biconcave. Maxillary reaching slightly past a vertical through posterior margin of orbit. Teeth in one row, unequal, the anterior ones considerably enlarged, posterior teeth of upper jaw very small and close-set. Mouth very oblique, a horizontal line through outer edge of upper lip nearly passing through upper rim of lower orbit; lower jaw somewhat projecting; chin angular; articulation of mandible angular, falling at some distance behind posterior rim of orbit. Position of

lower eye somewhat behind upper. Anterior nostril with a comparatively short flap on hind edge; posterior nostril larger, its rim not raised. Preanal spine not evident. Length of a chord subtending the curve in the lateral line 3.4 in straight part, to end of hypoural, a vertical from a chord to apex of curve 2.7 in the chord. Specimen faded and color can not be described.

Measurements.—Total length, 321. Standard length, 264. Depth, 116 (44); head (to end of scaled part, not including the soft border), 74 (28); maxillary, 36 (13.6); interorbital, 5.8 (2.2); pectoral of eyed side, 41 (15.5); pectoral of blind side, 32.5 (12.3); caudal, 56 (21.2); ventral of eyed side, 25.8 (9.8); ventral of blind side, 24.3 (9.2); depth of caudal peduncle, 27.5 (10.4); snout, 18 (6.8); eyeball, 12.8 (4.8); straight part of lateral line, 150 (56.8).

Holotype.—U.S.N.M. No. 34919. Latitude 10° 37′ 40″ N., longitude 61° 42′ 40″ W. (off Trinidad, West Indies); February 3, 1884; 31 fathoms; beam trawl; *Albatross.*

Remarks.—This species is evidently very close to *Paralichthys squamilentus* Jordan and Gilbert,[5] but it differs in a number of characters. The vertebrae in the type specimen are 10+26, while in one specimen of *squamilentus* that has been dissected they are 10+28. The most striking difference on superficial examination is the presence of numerous accessory scales in *tropicus*, while of all the specimens of *squamilentus* now known but a single accessory scale was found on one after a prolonged search with a binocular microscope. *P. squamilentus* has a very deep body, in seven specimens measured, 96 to 120 mm in total length, the depth varied 46.6 to 52.3 per cent of the length without caudal, while in the type of *tropicus* it is 44 per cent. The numbers of fin rays in the dorsal and anal of the type fall just outside the frequency distributions for these characters in 12 specimens of *squamilentus.* Of the characters enumerated, the depth, and the profuseness of accessory scales in those species of *Paralichthys* in which they are present, are dependent on age to a certain extent, and since the largest known example of *squamilentus* is but 120 mm long, the available specimens of the latter species are consequently not fairly comparable with the larger specimen here described. Nevertheless, the differences are too pronounced to be caused wholly by the variation in the size of the specimens compared. When the sum total of differences is considered it becomes evident that the specimen here described represents a hitherto unknown species, although the precise degree of divergence between *squamilentus* and *tropicus* remains to be elaborated by frequency distribution studies of the meristic differentiating characters, as it is, indeed, necessary to do in nearly all species of *Paralichthys.* A consideration of the remote location of the two species, taken by itself, presents the probability strongly in favor

[5] Proc. U. S Nat. Mus., vol. 5, p. 303, 1882.

of the two species being distinct, since the numerous American species of *Paralichthys*, with one or two exceptions, have a markedly restricted distribution. No specimen of *Paralichthys* has hitherto been recorded from that long stretch of coast in the western Atlantic, extending from Florida or from Texas to Rio de Janeiro, except one specimen of *brasiliensis*, which Günther doubtfully referred to Guatemala.[6] From *Paralichthys brasiliensis* (Ranzani),[7] which occurs nearer the range of the present species, *tropicus* may be distinguished by the lesser number of gill rakers and the more numerous accessory scales. The difference between the present and other closely related species will be taken up in greater detail in a monographic study of the genus *Paralichthys* now in course of preparation.

Subfamily BOTHINAE

Genus ENGYOPHRYS Jordan and Bollman

ENGYOPHRYS SENTUS, new species

Description of type.—Sinistral. D. 79. A. 64. Lateral line with a high arch in front and well developed on eyed side, each scale having a raised longitudinal canal or a groove; almost absent on blind side, no trace of arch and no well-developed canals or grooves on scales, only a few having a feeble dent or groove near center. Anterior accessory branch of lateral line feebly developed on eyed side, short, V-shaped, disconnected from main lateral line. Scales ctenoid on eyed side, cycloid on blind side, quite large, 14 in curve of lateral line, 37 in straight part to end of hypoural and 1 similarly large perforate scale on base of caudal. Scales cover entire head and body, except snout and lower jaw. No accessory scales. Gill rakers very short, pimplelike, 4 on lower limb of first gill arch on blind side, 6 on eyed side; upper limb almost smooth on blind side, 3 very minute, hardly perceptible protuberances on eyed side. Mouth very small, maxillary falling short of anterior margin of eye. Eyes large, the lower having its position somewhat more anterior than the upper. Interorbital narrow, reduced to mere ridge, with four spines more or less directed backward, the first in a line with anterior margin of lower eyeball and but slightly inclined backward, the third nearly over middle of lower eye and strongly inclined to horizontal, the first three about evenly spaced and gradually making a more acute angle with a horizontal plane; the fourth spine blunt, horizontal, and more remotely spaced, situated just behind posterior margin of lower eyeball. A spinous process on ocular shelf, in front of upper eye, directed upward; two such processes in front of lower eye, approximate and more or less directed downward. Teeth absent on eyed side (none seen on examination with a binocular microscope on undissected fish);

[6] Trans. Zool. Soc. London, vol. 6, p. 473, 1868.
[7] See U. S. Nat. Mus. Bull. 47, pt. 3, p. 2626, 1898.

teeth on blind side small, pointed, somewhat recurved, in a single row. Origin of dorsal somewhat in front of anterior margin of eye; its anterior rays shorter than those over middle of body; origin of anal nearly under base of pectoral; end of vertical fins not far from base of caudal, resulting in a short peduncle; a short, rather blunt spine in front of anal origin, directed forward. Tip of pectoral on eyed side almost but not quite reaching lateral line, pectoral of blind side but slightly shorter than that on opposite side. Base of left ventral attached to ridge of abdomen, that of blind side having a base not quite so broad and attached slightly above abdominal ridge; tip of left ventral extending but slightly more backward than right, both about extending to base of fifth anal ray. A sharp bony expanded process between the two ventrals, covered with thin skin so as to be plainly visible exteriorly, consisting of two flat, expanded, elongate, spinelike bones, joined together lengthwise, with their tips projecting beyond the skin, spinelike.

Color pattern not evident, probably faded. Upper surface straw-colored, irregularly clouded with bluish. A faint indication of three blotches on lateral line, one at bend, one in front of caudal peduncle, and one in between. Lower surface immaculate.

Measurements.—Total length, 83. Length without caudal, 68. Depth, 38 (55.5); head, 15.5 (22.8); maxillary, 3.8 (5.6); snout, 4 (5.9); eyeball, 5.5 (8.1); interorbital, 1.2 (1.8); depth of caudal peduncle, 7.8 (11.5); caudal, 15 (22.1); left pectoral, 9.4 (13.8); right pectoral, 8.5 (12.5); left ventral, 10 (14.7); right ventral, 8.7 (12.8); straight part of lateral line, 41.5 (61). Length of a chord subtending the arch in the lateral line, 3.5 times in straight part; length of a vertical from the chord to the apex of the arch, 2.5 in the chord.

Holotype.—U.S.N.M. No. 91402. Off Dry Tortugas, Fla.; latitude 24° 23′–25′ N., longitude 82° 57′–58′ W.; 50 fathoms; November 26, 1919; collected by the *Albatross*.

Remarks.—The present species differs strikingly from *Engyophrys sancti-laurentii* Jordan and Bollman[8] in having four spines, instead of one, on the interorbital, and in having well-developed spinous processes on the ocular shelves in different positions than the mere protuberances in the older species. The scales in *sentus* are less numerous; and the shape of the body is different, the posterior half not tapering quite so gradually to the caudal peduncle.

Genus SYACIUM Ranzani

SYACIUM GUNTERI, new species

Diagnosis.—No spines on snout. Scales in 47 to 54 oblique rows over lateral line, from upper angle of gill opening to base of caudal (range of 28 individuals), the number of perforate scales in lateral

[8] Proc. U. S. Nat. Mus., vol. 12, p. 176, 1889.

line a few less, 44 to 51 (range of 19 specimens) to base of caudal, 2 or 3 similar perforate scales on caudal at its base. Dorsal rays 74 to 82. Anal rays 59 to 65. Number of rays in right pectoral usually 9 (in 42 specimens), infrequently 8 (in 4) or 10 (in 2); rays in left pectoral usually 11 (in 36), sometimes 10 (in 11), infrequently 9 (in 1). Gill rakers on upper limb of first gill arch quite small, usually 3 (in 32 fish), often 2 (in 17), rarely 4 (in 1 specimen); quite large on lower limb, nearly always 7 (in 47), infrequently 6 (in 3). Body quite deep, greatest depth about 2 in length without caudal. In 29 specimens 101 to 126 mm in total length, the measurements expressed as a percentage of the standard length vary as follows: Depth, 48.2 to 55, average 51.4; head, 26.7 to 29.5, average 27.6; maxillary, 10.8 to 12.8, average 11.7; eye, 6.5 to 8, average 7.2; right pectoral, 14.6 to 18.6, average 16.7. In 21 specimens 65 to 99 mm long: Depth 47.3 to 53.4, average 49.5; head, 26.7 to 30, average 28.3; maxillary, 10.8 to 12.9, average 11.8; eye, 7.1 to 8.9, average 8; right pectoral, 15.2 to 19.2, average 17. Width of maxillary and length of filamentous ray of left pectoral differing with size, but apparently not markedly with sex. If there is an average difference in the two sexes in the interorbital width and the extent of the longest ray of the left pectoral, it may be determined only by dissection, my rough data not showing any line of demarcation in these two measurements by which to separate the sexes without dissection. The 50 specimens measured, divided into three groups by size, irrespective of sex, gave the following results: In 15 specimens 111 to 126 mm long—interorbital, 3 to 4.5 per cent of standard length, average 3.4; filamentous ray of left pectoral, 23.7 to 35.3, average 27.9. In 21 specimens 94 to 109 mm long—interorbital, 1.9 to 3.9, average 2.9; longest ray of left pectoral, 22.5 to 36.8, average 28.3. In 11 specimens 65 to 92 mm long—interorbital, 1.6 to 3.2, average 2.1; left pectoral, 21 to 28.5, average 24.9.

The frequency distribution of the dorsal and anal rays in 50 specimens is as follows:

Dorsal Rays

Number of rays	74	75	76	77	78	79	80	81	82
Number of specimens	1	1	3	4	11	12	10	5	3

Anal Rays

Number of rays	59	60	61	62	63	64	65
Number of specimens	1	7	7	10	16	7	2

Color.—Nearly uniformly dusky or irregularly shaded with a dirty brown on upper side; two diffuse dark blotches on lateral line, one more or less in front of tip of pectoral, another near ends of vertical fins faintly ocellated; another blotch, faintly ocellated, a little below lateral line, between the other two blotches, sometimes present; other

very diffuse blotches on body sometimes indicated, in rows along bases of dorsal and anal fins and between those and lateral line, some of these blotches faintly ocellated; an ocellated spot on middle of caudal about one-third distance from base to posterior margin usually present, often most marked blotch, with one or two transverse rows of smaller spots behind; vertically elongate, narrow, dark spots, spaced rather widely apart, on dorsal and anal fins.

Material studied.—Off Aransas Pass, Tex.; 5 to 10 fathoms, March 5, 1917; *Grampus*; 21 specimens, 89 to 120 mm in total length. Eleven miles SSW. off Heald Lightship, Tex.; 10 fathoms; March 16, 1917; *Grampus*; 27 specimens, 65 to 111 mm. Off Galveston, Tex.; 4.5 to 10 fathoms; February 26, 1917; *Grampus*; 10 specimens, 87 to 126 mm. About 30 miles off Grand Isle, La.; August 6, 1930; Martin D. Burkenroad; 1 specimen, 124 mm. Twelve miles SE. off Barataria Light, La.; Gordon Gunter; 2 specimens, 109 to 123 mm. Mayaguez, Puerto Rico; *Fish Hawk*; 4 specimens, 89 to 101 mm (U.S.N.M. No. 63047 being part of the material recorded as *Syacium micrurum* by Evermann and Marsh[9]). Total number of specimens examined 65, 65 to 126 mm in length, of which 50 were studied in detail, including the 3 specimens from Louisiana and the 4 from Puerto Rico.

Holotype.—U.S.N.M. No. 92800. One of the specimens taken by Gordon Gunter off the coast of Louisiana, 123 mm in total length, is designated as the holotype.

Remarks.—This is evidently a common species in the Gulf of Mexico. In its deep body and comparatively small number of fin rays the present species closely agrees with (*Rhomboidichthys*) *Syacium cornutum* Günther[10] and differs from the latter in the absence of spines on the snout. From its common congener in the region of the straits of Florida, currently designated as *Syacium papillosum*, probably incorrectly, the present species may be distinguished by fewer fin rays, a deeper body, and by its smaller size, the interorbital in the present species becoming comparatively wide on reaching a size at which specimens of "*Syacium papillosum*" still show the narrow interorbital characteristic of the juvenile. Mr. Gunter, who sent me two specimens from Louisiana for identification at a time when I made a preliminary study of the species, also noted the deep body and the few fin rays of his material as compared with current descriptions. However, there is more or less intergradation between the two species with respect to those characters, and individual fishes are sometimes difficult to refer to their proper species. Material is now being gathered for a revision of the genus *Syacium* in order to take up in greater detail the difference between the several species. This species is named after

[9] The Fishes of Porto Rico, p. 324, 1900.

[10] Voyage of H. M. S. *Challenger*, Zool., vol. 1, p. 7, pl. 2, fig. B, 1880.

Gordon Gunter, who is a member of the staff of investigators of the Bureau of Fisheries working on the shrimp problem, in appreciation of the aid he rendered in my studies of the Gulf coast fishes during 1931 and for other courtesies shown.

Family ELEOTRIDAE

ELEOTRICA, new genus

Genotype.—*Eleotrica cableae*, new species.

Definition.—Ventrals closely approximated, but altogether separate. Entirely scaleless. First dorsal with seven flexible spines. The two dorsal fins separate. Second dorsal with more rays than the anal, 12 and 11 rays, respectively. Teeth pointed, in bands, outer row of both jaws more or less enlarged, but no definite canines; no teeth or vomer or palatines. Body moderately elongate. Caudal short, rounded. Maxillary moderate, not extending past posterior margin of eye. No spine on preopercle. Shoulder girdle without flaps of skin. Tongue rather emarginate, the cleft not deep. Cutaneous papillae on cheek in transverse and longitudinal rows; a series of short transverse rows along middle of body; some of papillae on top of head and over opercle greatly developed to form short tubules.

Remarks.—Of the known gobioid genera, as far as their external characters are concerned, *Eleotrica* seems to be most nearly related to *Chriolepis* Gilbert.[11] A reexamination of the type of *Chriolepis minutillus* brings to light some inaccuracies and omissions in the original description, which are here corrected in order to show the divergence between the two genera. *C. minutillus* has some well-developed scales posteriorly. There is a single row of four strongly ctenoid scales on the caudal, at its base. The spinules at the hind margin of these scales are conspicuously well developed, especially on the upper and lower scales, which are considerably larger than the other two, and the spinules laterally are very long, becoming gradually shorter toward the center. There are also two large scales on the caudal peduncle, one behind the other, near the base of the caudal fin. Whether other scales were originally present is not evident on the type specimen. The scales as described above are present only on the right side; the left side having but a single scale left, the others apparently having fallen off. No tubular pores are present. The teeth are in more than one row in both jaws, as in related genera, not in a single series in the mandible as described originally. Cutaneous papillae on the cheek are not evident in the type specimen, but this may be due to its state of preservation. *Eleotrica*, therefore, differs from *Chriolepis* chiefly in the total absence of scales and in some of the pores being markedly tubular. In its physiognomy *Eleotrica* is quite similar to *Gobiosoma* (see p. 13).

[11] Proc. U. S. Nat. Mus., vol. 14, p. 557, 1891.

ELEOTRICA CABLEAE, new species

FIGURE 1

Gobiosoma crescentale KENDALL and RADCLIFFE (not Gilbert), Mem. Mus. Comp Zool., vol. 35, p. 148, 1912 (Chatham Island, Galapagos Archipelago).

Description of type.—Body moderately elongate, depth 5.2 in length without caudal. Head quite depressed, its depth behind eye 2.3 in its length. Mouth somewhat oblique, lower jaw projecting. Maxillary extending to a vertical nearly through posterior margin of eye. The two nostrils in front of eye, one behind the other, both ending in a tubule. Teeth pointed, in bands, outer row of upper jaw markedly enlarged, outer and inner rows of lower jaw moderately enlarged. Anterior margin of tongue with a rather shallow emargination. Ventral 1.4 times in distance from its base to origin of anal, its base under that of pectoral; the two ventrals entirely disconnected; their bases very closely approximated; no interspinal membrane.

FIGURE 1.—*Eleotrica cableae*, new species, from the type specimen

D. 7–12. A. 11. Origins of second dorsal and anal nearly on same vertical; end of anal base under base of third dorsal ray from its end; posterior rays of dorsal and anal nearly, but not quite, reaching base of caudal. Dorsal spines only slightly filamentous, the fourth not quite reaching origin of second dorsal, the fifth just reaching origin. Tip of pectoral about reaching a vertical through vent.

Five pores ending in tubules; 3 behind eyes, 1 on midline, and 1 on a level through the middle of each eye; 1 each at upper anterior corner of opercle; height of tubules about equaling two-thirds diameter of pupil. Four transverse rows of papillae on cheek, the first 3 rows under eye, more or less oblique, the fourth vertical, very slightly behind eye; 2 very short rows radiating from eye between third and fourth rows; 2 short longitudinal rows on cheek not so well marked; 2 rows on underside of lower jaw continued upward along margin of preopercle, the papillae of the inner row being coarser; a transverse row along anterior margin of opercle, 2 lengthwise rows on opercle, 1 above and 1 below; a few small groups of papillae over the opercle; a short transverse row behind eye; a series of short transverse rows along middle of body.

Measurements.—Total length, 69. Standard length, 54.5. Depth, 10.4 (19.1); least depth of caudal peduncle, 6.8 (12.5); length of ventral, 11.9 (21.8); distance from ventral to anal origins, 17.3 (31.7); length of head, 15.6 (28.5); depth of head directly behind eye, 6.7 (12.3); maxillary, 7.2 (13.2); snout, 3.7 (6.8); eyeball, 3.3 (6.1); interorbital, between soft margin, 2 (3.7); postorbital part of head, 10 (18.3); antedorsal distance, 19 (34.9); caudal, 14.3 (26.2).

Color.—Head and body prettily marbled with brown and yellow, without definite crossbars. Two yellowish bars on cheek rather faintly indicated. The marblings on the back at the base of the first dorsal faintly tend to a cross-streaked arrangement. Ventral aspect plain yellowish. Fins plain, more or less uniformly dusky; caudal with a transverse band of dusky, more intense than rest of fin, flush with its base and having a convex margin posteriorly.

Holotype.—U.S.N.M. No. 65517. Male. Chatham Island, Galapagos Archipelago; January 7, 1905; collected on shore by the *Albatross*.

Remarks.—Two specimens of this species, taken at the same place, were recorded by Kendall and Radcliffe. Only the type has been studied by me. In preparing a revised account of the genus *Gobiosoma*, I studied the specimen described above, intending to include it in that genus as a new species. On drawing an illustration of the specimen, Miss Louella E. Cable, after whom I take pleasure in naming the species, called my attention to the ventral fins not being united, showing that the species is not a member of *Gobiosoma*.

Family GOBIIDAE

GOBULUS, new genus

Genotype.—*Gobulus crescentalis* (Gilbert) = *Gobiosoma crescentalis* Gilbert.

Definition.—Ventral fins united (in the three specimens of the genotype examined the ventrals are united only for about half their extent, at the base, but the distal half of the membrane is apparently torn, the ventrals probably having been united for their whole extent in life). No interspinal membrane. Entirely scaleless. First dorsal with seven flexible spines. The two dorsals separate. Second dorsal having more rays than the anal, 12 and 11 rays, respectively. Teeth in bands in both jaws, the outer rows enlarged; no canines. Body moderately elongate. Caudal short. Maxillary moderate, not extending past posterior margin of eye. Shoulder girdle without flaps of skin. Tongue entire. Cutaneous papillae on cheek in transverse and longitudinal rows; a series of short transverse rows present on middle of body.

Remarks.—While this new genus agrees with *Gobiosoma* in nearly all technical characters, it differs radically from the latter as well as

from nearly all other genera of the family Gobiidae in lacking an interspinal membrane. The families Eleotridae and Gobiidae are now distinguished mainly by the structure of the ventral fins. In the Gobiidae the two ventrals are united medially by an interradial membrane, while a shorter membrane nearly always arches across the two fins, being attached to the short lateral ray of each fin and to the base of the fins in front, thus forming a scoop or funnel-shaped structure. In the Eleotridae the two ventrals are closely approximated but not joined together. It is to be noted that the three genera *Eleotrica*, *Gobulus*, and *Gobiosoma*, which otherwise agree in nearly all technical characters and are very similar in general appearance, form a gradated transition from the Eleotridae to the Gobiidae in so far as it relates to the structure of the ventral fins. An even more striking transition between the two families was recently described in the case of some European scaled gobies.[12] It is evident that the chief character hitherto employed in separating the two families is not satisfactory. Moreover, the divergence in the structure of the ventrals apparently occurred independently in widely separated phylogenetic lines. Regan[13] attempts to divide the two families on the basis of osteological characters also, but since his study is apparently based on very few genera, it is not conclusive. The proper separation of the two families, showing their differences and their limits, still remains to be worked out.

GOBULUS CRESCENTALIS (Gilbert)

FIGURES 2, 3

Gobiosoma crescentalis GILBERT, Proc. U. S. Nat. Mus., vol. 14, p. 557, 1891 (Gulf of California, lat. 24° 22′ 15″ N., long. 110° 19′ 15″ W.; 7 fathoms).

Gobiosoma crescentale JORDAN and EVERMANN, U. S. Nat. Mus. Bull. 47, pt. 3, p. 2259, 1898 (erroneously said to have been taken in 79 fathoms).

Gobiosoma crescentale PELLEGRIN, Bull. Mus. Hist. Nat. Paris, vol 7, p. 162, 1901 (Gulf of California).

Gobiosoma crescentale OSBURN and NICHOLS, Bull. Amer. Mus. Nat. Hist., vol. 35, p. 175, 1916 (Agua Verde Bay, Gulf of California).

Diagnosis.—D. 12, A. 11 (same count in three specimens examined). Greatest depth, 15.3–17 per cent; least depth of caudal peduncle, 9.8–11.2 per cent; head, 27.6–28.6 per cent; ventral, 20.2–21.4 per cent of standard length. Head markedly depressed, flat on top, its lower profile somewhat curved, its depth directly behind eyes 2.5 in its length. Ventral of medium length, 1.7 times in distance from its base to origin of anal. Both nostrils in front of eye, one behind the other, ending in short tubules. Three pimplelike projections of skin behind inner margin of upper lip, one below anterior nostril and two near level of lower margin of eye. Inner row of papillae along lower jaw

[12] See De Buen, Trab. Inst. Español Oceanogr., no. 5, 1930.

[13] Ann. Mag. Nat. Hist., ser. 8, vol. 8, pp. 729–733, 1911.

conspicuously enlarged to form tiny flaps. Three transverse rows of papillae under eye and a fourth on cheek behind eye. A few short rows radiating from eye. One lengthwise row nearly at middle of cheek extending for a short distance from upper lip. Two rows along lower jaw, extending upward along posterior margin of preopercle, the inner row conspicuously enlarged, as stated. A trans-

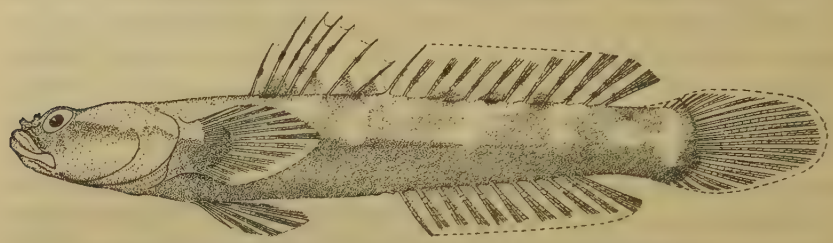

FIGURE 2.—*Gobulus crescentalis* (Gilbert), from the type specimen

verse row along anterior margin of opercle, and two short lengthwise rows on opercle. A series of short transverse rows along middle of body.

Color.—Ventral aspect of fish darker in color than upper part. Lower half uniform cocoa brown, the rather coarse chomatophores being evenly distributed. Upper half lighter, yellowish blotched with brown, the yellowish ground color forming a series of more or less diffuse, vertically elongate, light-colored areas. Caudal with a brown

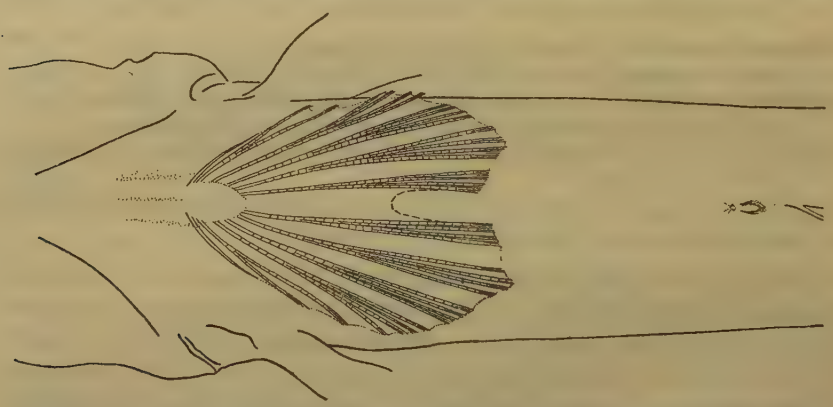

FIGURE 3.—A ventral view of *Gobulus crescentalis* (Gilbert) showing the ventral disk. Note the absence of an interspinal membrane. The two ventrals are disconnected distally, the interradial membrane, most probably, being torn

crescent-shaped band, near to but a little removed from its base; the upper end of the band narrow, the lower end broader and merging with the pigment of the caudal peduncle. The two specimens from Agua Verde Bay are darker than the type; they have the dark crescent on the caudal wider and somewhat merging posteriorly with the diffuse pigmentation of the rest of the fin; and they also show a

lengthwise row of small dark spots above the median line of the body, continued on the upper aspect of the head, the row extending from the preopercle nearly to base of the caudal.

Remarks.—This species may be readily recognized by its peculiar coloration, as well as the distinctive structural characters. The above account is based on the type and on the two specimens from Agua Verde Bay recorded by Osburn and Nichols, the total length of the three specimens ranging from 34 to 41 mm.

Genus GOBIOSOMA Girard

GOBIOSOMA ROBUSTUM, new species

Description of type.—No scales on caudal. Mental frenum not bilobed. D. 7–12. A. 10. Body quite short and stocky. Head moderately depressed, depth behind eye 1.7 in its length. Cheeks tumid. Mouth oblique, lower jaw but slightly included, nearly coterminal with upper jaw; lips fleshy. Maxillary reaching to a vertical through posterior margin of pupil. Teeth in bands, outer and inner rows of both jaws, considerably enlarged. Anterior nostril ending in a short tubule; posterior nostril with its rim slightly raised. Barbule in front of eye not evident. Base of ventral and that of pectoral nearly on same vertical; origin of first dorsal at some distance behind this. Tip of pectoral not quite reaching to a vertical through origin of second dorsal. Ventral of medium length, 1.5 in distance from its origin to origin of anal, 21 per cent of body length. Origin of second dorsal but slightly in advance of that of anal; end of anal under base of third dorsal ray from its end. Tips of posterior dorsal rays reaching base of caudal, those of anal not reaching quite that far. Membrane from last dorsal ray closely adherent to back, the normal position of that ray being nearly horizontal.

Measurements.—Total length, 55.5. Standard length, 45. Depth of body, 11.4 (25.3); least depth of caudal peduncle, 7 (15.6); depth of head directly behind eye, 8 (17.8); length of head, 13.6 (30.2); maxillary, 6 (13.3); snout, 4 (8.9); eye, 3 (6.7); interorbital, soft part, 3.5 (7.8); postorbital part of head, 8.7 (19.3); antedorsal distance, 15.7 (34.9); ventral, 9.6 (21.3); pectoral, 10.9 (24.2); caudal, 10.6 (23.5); distance from ventral to anal origins, 14.5 (32.2).

Color.—Body crossbarred with nine broader brown bands, alternated with narrower, lighter bars; the alternating bands and bars not sharply differentiated; the brown bands not uniformly colored, mottled with lighter and darker shades; the lighter crossbars not altogether straight, more or less sinuous or oblique, sometimes incomplete. A median row of small brown spots, distinct, one on a brown band, sometimes two. Fins nearly uniformly dusky, ventral and first dorsal darkest, the latter somewhat blotched with black.

Holotype.—U.S.N.M. No. 92802. Male. Laguna Madre, near Corpus Christi Pass, Tex.; April 7, 1927; collected by John C. Pearson.

Remarks.—This is a very common species on the northern part of the Gulf of Mexico; but it has, as yet, received no name. Another species, *bosci*, is also common on the Gulf coast. Both of these species have been confused by most authors and treated under one name. The name applied in the literature to this composite of two common species has been either *molestum* or *bosci*, depending on whether any particular author "regarded" the population of common naked gobies on the Gulf coast as being distinct from that of the Atlantic coast or identical. The type of *molestum*, which has been examined, proved to be a specimen of *bosci*, thus requiring a name for the second common species. *Gobiosoma robustum* is readily separated from *bosci* by fewer fin rays in the dorsal and anal, by a longer ventral disk, and by a different color pattern. The naked gobies of the Atlantic and Gulf coasts of the United States have been badly confused in the literature and have been distinguished and identified generally by geographical lines rather than by morphological differences. A revision of the genus, showing in detail the morphological as well as the geographical limits of the species, is now nearly completed. Specimens of the present species were examined from Indian River at Cocoa, east coast of Florida; Cape Sable, Fla.; Apalachicola and Pensacola, west coast of Florida; Cat Island, Miss.; Grand Isle, La.; and Corpus Christi, Tex.

ARUMA, new subgenus

Subgenotype.—*Gobiosoma occidentale*, new species.

Definition.—This subgenus differs chiefly from typical *Gobiosoma* in having a deeply cleft tongue, a character which is currently used in separating gobiid genera. The small but well-developed barbule in front of the eye, which is present in *Aruma*, is but faintly indicated or rudimentary in typical *Gobiosoma*, while the head is markedly more depressed in *Aruma*. Besides the following new species, this subgenus includes also *Gobiosoma histrio* Jordan.[14]

GOBIOSOMA OCCIDENTALE, new species

Description of type.—No scales on caudal. Mental frenum not bilobed. D. 7–12. A. 11. Body markedly slender, depth 6.1 times in length without caudal. Head notably depressed, its depth directly behind eyes 2.5 times in its length, considerably less than its width at the same point. Mouth somewhat oblique, outer edge of upper jaw on a horizontal line below lower margin of eye; lower jaw somewhat projecting; lips wide. Maxillary about reaching a vertical through posterior margin of pupil. Anterior nostril in a short tubule;

[14] Proc. U. S. Nat. Mus., vol. 7, p. 260, 1884.

posterior nostril with a raised margin, the rim in front being continued into an expanded tiny flap fitting snugly over opening of nostril when bent over. Barbule in front of eye at posterior edge of upper lip small but very distinct. Tongue with a rather broad, V-shaped emargination in front, continued into an abrupt narrow cleft of medium depth, at mid line. Teeth in bands, those in outer row in either jaw, especially those in upper jaw, conspicuously enlarged. Base of ventral nearly under that of pectoral, tip of latter falling short of a vertical through anus. Origin of first dorsal considerably behind base of pectoral. Origin of second dorsal a little in advance of the anal, end of base of latter under base of tenth dorsal ray; posterior margins of both vertical fins free, not connected by membrane to mid line. Body light brown with six lighter yellowish cross bands, rather diffuse, not sharply differentiated. Fins without color marks, plain yellowish.

Measurements.—Total length, 44.2. Standard length, 36.4. Depth, 6 (16.5); least depth of caudal peduncle, 3.7 (10.2); length of head, 10.6 (29.1); depth of head behind eye, 4.3 (11.8); ventral, 6.7 (18.4); distance ventral to anal origin, 12.2 (33.5); maxillary, 4.6 (12.6); snout, 2.8 (7.7); eye, 2.5 (6.9); interorbital, 1.4 (3.8); postorbital part of head, 6.5 (17.9); antedorsal distance, 14 (38.5); caudal, 8.2 (22.5).

Holotype.—U.S.N.M. No. 92801. Female. La Paz Harbor, Gulf of California; March 12, 1889; *Albatross.*

Remarks.—The present species is evidently closely related to *Gobiosoma histrio* Jordan but differs in the more slender caudal peduncle and body, in having fewer fin rays, and in the color.

DILEPIDION, new subgenus

Subgenotype.—*Gobiosoma ginsburgi* Hildebrand and Schroeder.

Definition.—This subgenus differs from typical *Gobiosoma*, as well as from the subgenus *Aruma*, in having 2 ctenoid scales, and 2 only, on the base of the caudal fin, 1 near the upper margin and 1 near the lower. This character is very constant in many specimens of *ginsburgi* examined and are conspicuous in fish as small as 22 mm in standard length (the smallest examined). The two scales are usually firmly adherent, but sometimes one or more have fallen out, in which case their pockets are readily discernible and are attached to the hind margin of the caudal peduncle, one near the upper corner and one near the lower. The subgenus *Gerhardinus* Meek and Hildebrand,[15] like *Dilepidion*, also has two ctenoid scales on the base of the caudal, but the new subgenus differs in not having the mental frenum bilobed. Besides the subgenotype, the following new species belongs to the present subgenus.

[15] Field Mus. Nat. Hist. Publ. Zool., vol. 15, pt. 3, p. 889, 1928.

GOBIOSOMA LONGIPALA, new species

Description of type.—Scales on base of caudal fin have fallen out, but three pockets plainly evident in the same positions occupied by the scales in *ginsburgi*, the fourth pocket probably torn. Mental frenum not bilobed. D. 7–12. A. 10. Head flattened on top and markedly depressed, the strikingly depressed head probably partly due to being thrown out of shape by spasmodic movements of the fish after capture or after being placed in preservative, but the species apparently having an unusually depressed head as a normal condition. Body moderately slender. Mouth rather large, somewhat oblique, lower jaw included. End of maxillary nearly on a vertical through posterior margin of eye. Anterior nostril in a short tubule, posterior nostril with a raised rim. Barbule in front of eye reduced to a mere pimple. Teeth in bands, outer row, especially that of upper jaw, strongly enlarged. Origins of first dorsal and ventral nearly on same vertical, which falls slightly behind base of pectoral. End of pectoral about attaining a vertical through origin of anal. Middle rays of ventral disk reaching fully to origin of anal. Origins of second dorsal and anal nearly on same vertical, tips of their posterior rays not reaching base of caudal; end of anal base under base of tenth dorsal ray. Dorsal spines moderately filamentous, tip of fifth spine reaching back to base of third ray of second dorsal. Caudal not pointed, rather short.

Measurements.—Total length, 39. Standard length, 31. Depth of body, 6.2 (20); depth of caudal peduncle, 4 (12.9); length of head, 10.3 (33.2); depth of head directly behind eye, about 5; maxillary, 5.4 (17.4); snout, 2.6 (8.4); eyeball, 2.3 (7.4); interorbital, between soft margin, 1.3 (4.2); postorbital part of head, 7 (22.6); antedorsal distance, 11.7 (37.8); ventral, 8 (25.8); caudal, 8.5 (27.4).

Color.—Body, from base of pectoral, with nine brown crossbars alternated with lighter bars of about same width. Lighter and darker crossbars fairly well delimited on anterior part of body; both rather uniformly pigmented; their edges rather sinuous, not entirely straight. A median series of small brown spots, each spot situated on one of dark bars; the small spots sometimes double, two being sometimes contiguous side by side. Vertical fins and ventral nearly black; pectoral and caudal dusky. Head irregularly sprinkled with brown dots; a couple of small spots in a row on its upper midline.

Holotype.—U.S.N.M. No. 86158. Male. Boca Grande, Fla.; April 2, 1917; taken by steamer *Grampus*.

Remarks.—The type is the only specimen known at present. This species is close to *Gobiosoma ginsburgi* Hildebrand and Schroeder,[16] differing chiefly in the longer ventral and the more depressed head.

[16] Bull. U. S. Bur. Fish., vol. 43, pt. 1, p. 324, fig. 195, 1928.

The color is strikingly different on direct comparison, and this is what first attracted my attention to the type specimen. The anal has one ray less than the great majority of specimens of *ginsburgi*, but since some specimens of the latter species also have 10 rays in the anal, the difference in the number of rays in the anal fin, if any, needs to be worked out by a frequency distribution study of numbers of specimens.

Genus EUCTENOGOBIUS Gill

Euctenogobius GILL, Ann. Lyc. Nat. Hist. New York, vol. 7, p. 45, 1859.

Genotype.—Euctenogobius badius Gill, by monotypy.

In 1859 Gill described a new species of goby, *Euctenogobius badius*, from the Amazon River, based on a single specimen. The above generic name was also introduced there for the first time, and since it contained but this single species, the latter must serve as the type of the genus. The species was described originally as having only one row of teeth in the upper jaw, and on the basis of this single character different species of gobies, of diverse generic types, have been assigned to the genus *Euctenogobius* from time to time by various authors, such as Günther,[17] Jordan and Gilbert,[18] Jordan and Evermann,[19] Meek and Hildebrand,[20] and others.

While working in the United States National Museum, comparing the gobies of the coast of the Gulf of Mexico with material from adjacent regions, I came across a jar labeled only *Euctenogobius badius*, "Amazon River" containing one specimen. This is probably Gill's original type, although it does not bear the red "type label." It is well preserved and agrees very closely with the original description in all details of structure and in color. The only important discrepancy is in the length of the head, which Gill states to be "little more than a sixth" of the total length, whereas it is only a little more than a fifth, this difference, most probably, being due to a slip of the pen or to an error in calculation.

An examination of the type specimen shows that it is most closely related to the species now placed in (*Chonophorus*) *Awaous*. It has the general appearance of the species of that genus and agrees with them in the squamation, the structure of the fins, and other characters. Moreover, it has the well-marked fleshy papillae on the shoulder girdle, a structure which is characteristic of *Awaous* and which was not mentioned in the description of the type specimen. In view of the general misinterpretation of this genus, as well as of the inadequate original description, the following account of the species and

[17] Proc. Zool. Soc. London, 1861, p. 372.
[18] U. S. Nat. Mus. Bull. 16, p. 633, 1883.
[19] U. S. Nat. Mus. Bull. 47, pt. 3, p. 2226, 1898.
[20] Field Mus. Nat. Hist. Publ. Zool., vol. 15, pt. 3, pp. 874-875, 1928.

genus is rendered in order to align the species with our present-day knowledge of the gobies.

Definition.—Ventrals free, completely united; interspinal membrane present, well developed. Body moderately elongate, scaled. Back in front of dorsal fully scaled, with scales extending to within a short distance back of eyes. Scales of medium size; ctenoid on body as well as on nape and occiput. Opercle and cheek naked. No barbels. Teeth entire, in a single row in upper jaw, in a band in lower jaw. No canines (in female). Shoulder girdle with fleshy papillae. Mouth moderate, maxillary not extending beyond posterior margin of eye. Tongue not emarginate. Pectoral rays all united by membrane. Caudal rounded. The two dorsal fins well separated; the first with six flexible spines, none being filamentous. Second dorsal and anal with an equal and moderate number of rays. No sharp crest nor well-defined keel in front of dorsal. Transverse and lengthwise rows of cutaneous papillae on cheek. Mucous canals present. Anal papilla of female rather large, blunt, subquadrate in preserved specimen, its distal margin finely fimbriate.

Remarks.—This genus is very close to *Awaous*. It is tentatively separated from the latter by the character of the dentition in the upper jaw, the type specimen showing but a single row of teeth in the upper jaw, whereas the species of *Awaous* are generally described as having smaller teeth behind the outer row. However, the availability of this character for generic division in this group of gobies is open to question. Very little is known regarding the variability of the smaller teeth behind the outer row of enlarged teeth in the upper jaw. In some of the species the smaller teeth are very close behind the outer row and being also covered by a thick mucous membrane are hard to observe. Sometimes, in descriptions that appear to refer to the same species, one author may state that the teeth are in one row, while another says they are in more than one row. Such conflicting statements are no doubt mostly due to errors of observation because of the difficulty of the subject matter, as stated; but in some cases it may be due to variability with individual fishes. This question can be settled only by a complete revision of the group and a thorough study of that character. Pending such study it seems best to maintain *Euctenogobius* as a genus distinct from *Awaous*. Eventually, however, it may be found necessary to merge these two genera.

In view of the close relationship and even possible identity of these two genera, a word may be said in regard to the status of the name *Awaous*. Some writers prefer to use the later name *Chonophorus* in place of *Awaous*, contending that the earlier name was originally proposed in the French form and hence unacceptable under the code.[21]

[21] See Poey, Memorias sobre la historia natural de la Isla de Cuba, vol. 2, p. 275, 1860; and Jordan and Eigenmann, Proc. U. S. Nat. Mus., vol. 9, p. 499, 1886.

This contention is evidently not in accordance with all the facts in the case. Cuvier and Valenciennes[22] divide the exotic species (from their standpoint) of their large and cumbersome genus *Gobius* into a number of more or less natural groups, which are plainly indicated in the table of contents as well as in the text. All the groups, except the one under consideration, are not supplied with separate names; but for the latter group they state, on page 97 (quarto ed., p. 73), as follows: "On pourrait réunir sous le nom d'*Awaous* un petit nombre d'espèces de gobies qui ont la tête plus alongée . . ." The group is briefly but aptly characterized, and the name is evidently in Latin form. There is no reason why it should not be acceptable under the code. While the genus was established in a somewhat noncommittal manner, yet the authors introduced a new name in scientific nomenclature, and the manner of its introduction is not different from some other generic names which are at present recognized. The group of gobies thus named *Awaous* included originally *ocellaris*, *nigripinnis*, *pallidus*, *guamensis*, *banana*, and *martinicus*. Later, Bleeker[23] designated its type as *Gobius ocellaris*. The name *Awaous*, 1837, which antedates both *Euctenogobius* and *Chonophorus*, is therefore valid, with *Gobius ocellaris* as its type species by subsequent designation.

EUCTENOGOBIUS BADIUS Gill

Euctenogobius badius GILL, Ann. Lyc. Nat. Hist. New York, vol. 7, p. 47, 1859.

Description of type.—D. 6–11. A. 11. Scales 55–13½. The body has markedly the aspect of a specimen of similar size in the United States National Museum, labeled *Chonophorus taiasica*. Mouth moderately oblique, low, terminal, a horizontal line through margin of upper jaw about bisecting cheek below eye. Lower jaw rather thin and narrowly rounded in front, almost angular, very slightly included. Maxillary reaching a vertical slightly past middle of eye. Snout broad and rounded, its profile suggesting the quadrant of a circle. Eye placed high, its upper margin about on the line of the profile. Squamation quite similar to the species of *Awaous*. Longitudinal rows of scales on body markedly regular; 55 oblique rows from upper angle of pectoral to base of caudal, 50 rows when counted on midline from base of pectoral, 13½ scales in an oblique row from origin of anal to base of second dorsal; 17 longitudinal rows from midline of belly, in front of vent, to back. Back in front of dorsal fully scaled; the scales extending nearly but not quite to the eyes, finely ciliated like those on body, gradually growing smaller anteriorly. No scales on cheek and opercle. Some small, partly embedded scales on base of pectoral and similar scales on chest. Belly scaled except a small area on midline directly behind ventrals. Teeth in upper

[22] Histoire naturelle des poissons, vol. 12, 1837.
[23] Arch. Néerland. Sci. Nat., vol. 9, p. 320, 1874.

jaw, rather large, pointed, slightly recurved, close-set, in a single row. (An examination with a binocular microscope after the preserving liquid was removed with filter paper showed no trace of smaller teeth behind the outer row, and they are most probably not present. There is a possibility that minute teeth are embedded in the thick mucous membrane, but this could not be determined more definitely without injury to the specimen.) Teeth in lower jaw smaller than in upper, subequal, in a narrow band, about four rows at symphysis, tapering off to a single row at angle of mouth, the band interrupted at symphysis by a narrow bare space. Tongue with a wide truncate margin in front, not emarginate. Three short fleshy flaps on shoulder girdle. Anal papilla broad, subquadrate, and rather flat in preserved specimen, its distal margin finely fimbriate, in appearance similar to that of females of *Awaous*. The two dorsal fins well separated, none of the spines of the first dorsal notably filamentous, not reaching origin of second dorsal when laid back. Origin of anal slightly behind that of second dorsal, both fins ending on nearly the same vertical, their posterior rays not reaching base of caudal when laid back; 11 rays in both fins (the first unbranched ray included and the last two which are approximate at their base being counted as one). Ventral ends well in advance of vent. Bases and tips of ventral and pectoral nearly on same verticals. Caudal fin not prolonged.

The cutaneous papillae and mucous canals may be described as follows, in so far as they be observed by a microscopic examination without treating the specimen with special reagents: 5 transverse rows under eye, the first one rather oblique, the others more or less vertical, the last one incomplete; 2 longitudinal rows on cheek, the upper at about middle of cheek extending from fourth transverse row to margin of preopercle, the lower extending from first to fourth transverse rows, anteriorly curving along outline of upper lip, posteriorly horizontal; a broadly curving row of papillae along angle of preopercle extending below to articulation of mandible and continued with some interruption along inner edge of lower jaw; 2 transverse rows on opercle, one near either margin, connected by a horizontal row not far from lower margin; a transverse row directly behind eyes, continued horizontally backward at level of middle of eye, to base of pectoral; a broadly V-shaped row forward from upper to lower nostril and backward to upper lip; a short lengthwise row connecting lower end of latter with middle of first transverse row under eye; a short row on inner side of upper nostril parallel to upper profile; a horizontal mucous canal along upper edge of opercle to middle of eye, thence curving along upper edge of eye to a conspicuous pore located at about end of anterior third of eye, where what appears like a short cross mucous channel connects the two from the opposite sides; mucous channels on snout not easily followed without special treatment; a transverse mucous canal along vertical edge of preopercle.

Measurements.—Total length, 82.5. Standard length, 67. Greatest depth (abdomen pressed to approximately normal position), 12.5 (18.7); depth of caudal peduncle, 6.8 (10.2); length of head, 17.2 (25.7); maxillary, 8.1 (12.1); snout, 6.4 (9.6); eye, 4.6 (6.9); interorbital, bony part, 1.2 (1.8); postorbital part of head, 9 (13.4); antedorsal distance, 23 (34.3); caudal, 16 (23.9); ventral, 15 (22.4) distance ventral to anal origins, 21 (31.3); base of anal, 18 (26.9); base of second dorsal, 19.5 (29.1). Some of the measurements given in the original description remeasured and restated are as follows: Depth, 6.6; head 4.8; caudal, 5.2 in total length; height of head behind eye about equal to its width 1.7 in its length.

Color.—The color is still fairly well preserved. The body is a warm cocoa brown with light-colored longitudinal streaks following regularly along the rows of scales, the streaks being made up of light dots, one on each scale. The head is clouded with plumbeous. The caudal is still faintly barred. The other fins are now nearly uniformly brown.

Type.—The type, described above, comes from the Amazon River and bears U.S.N.M. No. 6091.

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